(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) Publication number: **0 087 621**
**A1**

(12) # EUROPEAN PATENT APPLICATION

(21) Application number: 83101186.1

(51) Int. Cl.³: G 01 F 5/00

(22) Date of filing: 08.02.83

(30) Priority: 08.02.82 JP 17511/82

(43) Date of publication of application:
07.09.83 Bulletin 83/36

(84) Designated Contracting States:
DE FR GB

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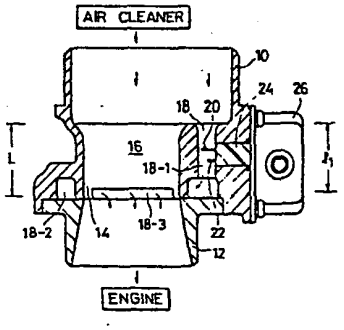
(54) **A method for measuring air flow and an air flow meter for internal-combustion engine.**

(57) The air flowing in through an air cleaner is passed through a main passage and sucked into an internal-combustion engine. A part of the air flowing through the main passage (16) flows in a by-pass passage (18). An air flow sensor (20) is provided in the by-pass passage. In this case, the length (1) of the bypass passage is substantially three or more times longer than that of a part (L) of the main passage corresponding thereto. Accordingly, even when the internal-combustion engine is operated with a throttle nearly totally open and the air in the main passage is pulsated, the average flow rate in the by-pass passage increases owing to the inertial lag effect obtained by lengthening the by-pass passage, so that it is possible to prevent the output of the flow sensor from undesirably lowering.

FIG. 11




EP 0 087 621 A1

Title of the Invention

A METHOD FOR MEASURING AIR FLOW AND AN AIR FLOW METER FOR INTERNAL-COMBUSTION ENGINE

Background of the Invention

Field of the Invention:

The present invention relates to an air flow meter and a method for measuring the flow rate of intake air supplied to an internal-combustion engine of an automobile or the like.

Description of the Prior Art:

There are a variety of known methods for measuring the flow rate of intake air supplied to an internal-combustion engine. Among them, heat-sensitive air flow meters, such as hot-wire air flow meters, are widely employed, since they are generally excellent in responsiveness and capable of measuring the mass flow rate. Such heat-sensitive air flow meters have been made well known by U.S.P. Nos. 3,747,577, 3,750,632 and 3,829,966. These known heat-sensitive air flow meters are arranged such that as a flow rate sensing part a platinum wire with a diameter of from 70 μm to 100 μm is stretched inside an intake pipe. This arrangement, however, is insecure in durability and easily mechanically damaged by a

FIG. 3

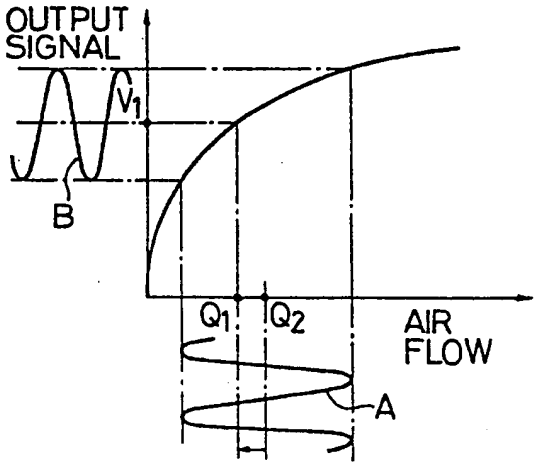



FIG. 4

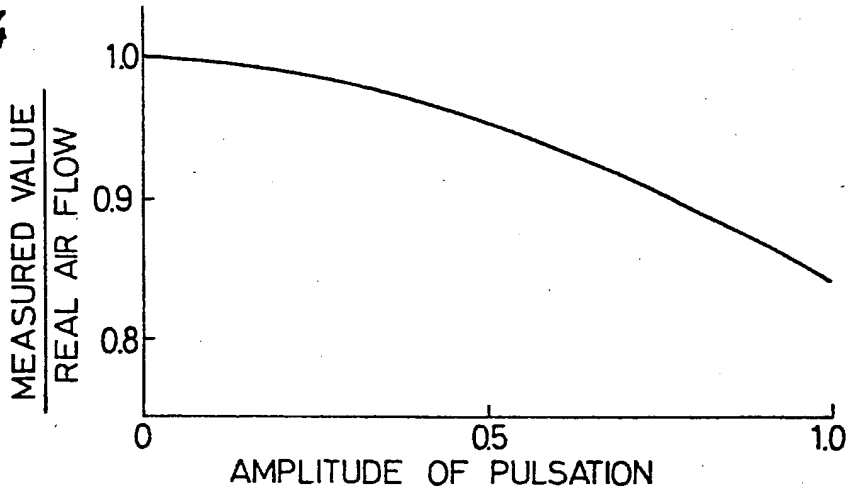



FIG. 5

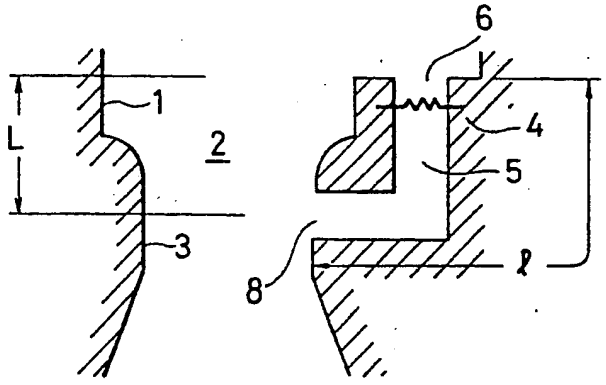


FIG. 10

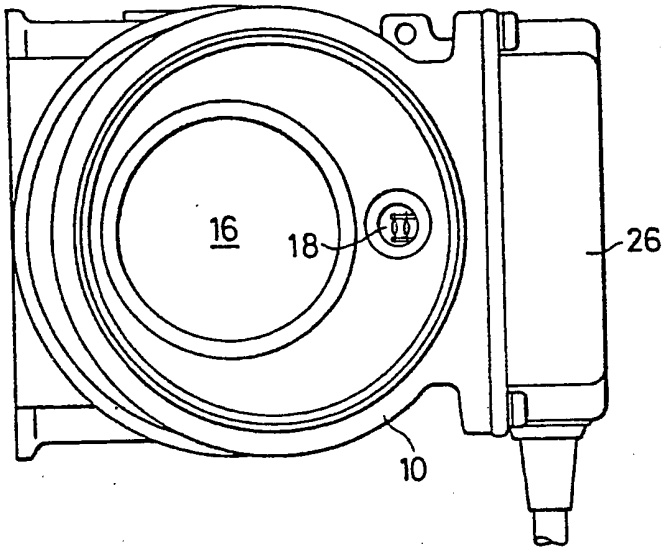

16
18
26
10

FIG. 11

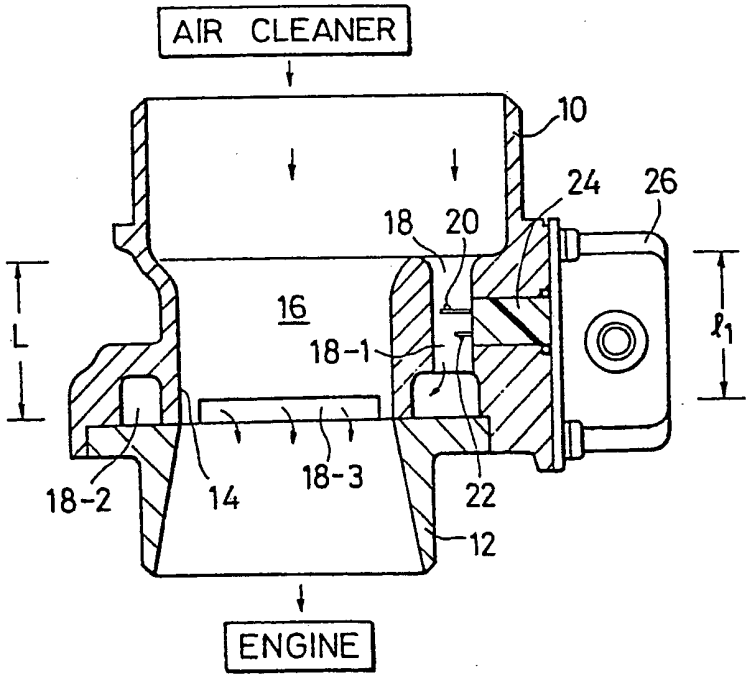

AIR CLEANER
10
24
26
18
20
16
L
18-1
$\ell_1$
18-2
14
18-3
22
12
ENGINE

FIG. 12

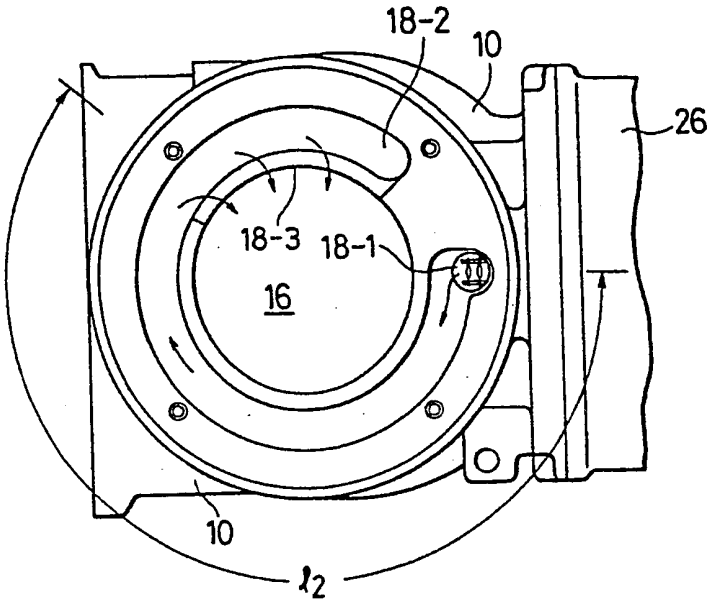

18-2
10
26
18-3
18-1
16
10
$\ell_2$

FIG. 13

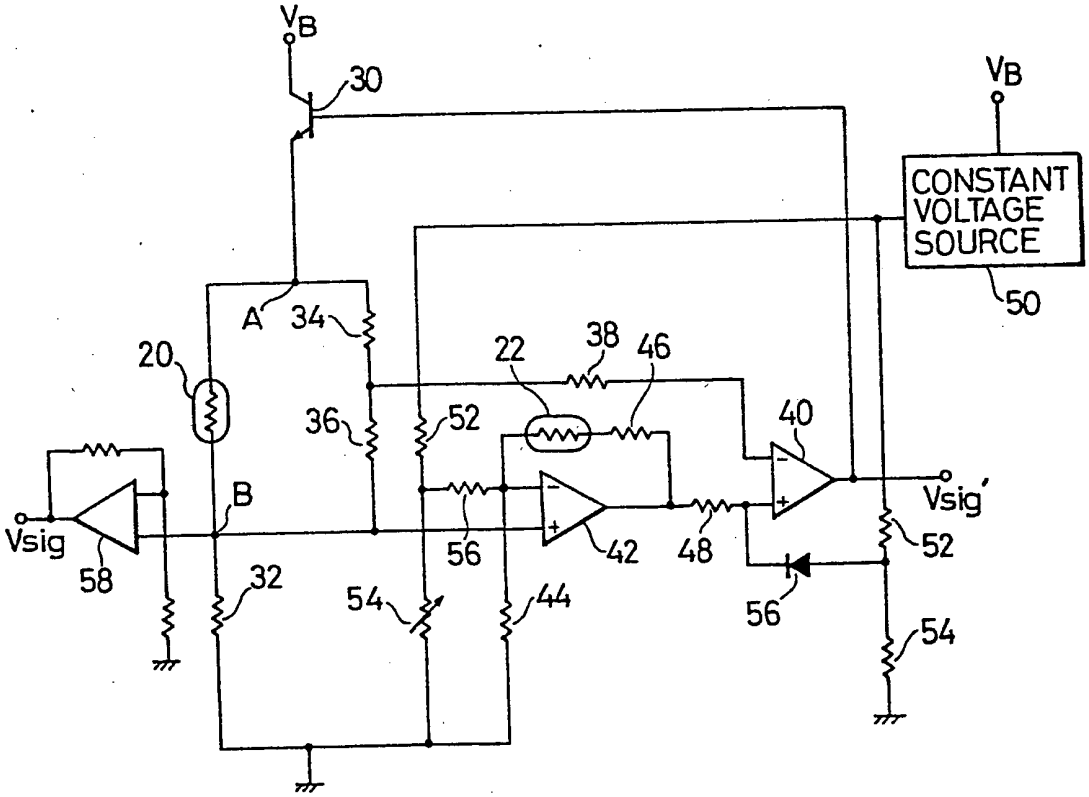

$V_B$
30
$V_B$
CONSTANT VOLTAGE SOURCE
50
A
34
20
22
38
46
36
52
40
B
Vsig
Vsig'
58
56
42
48
52
32
54
44
56
54

FIG. 14

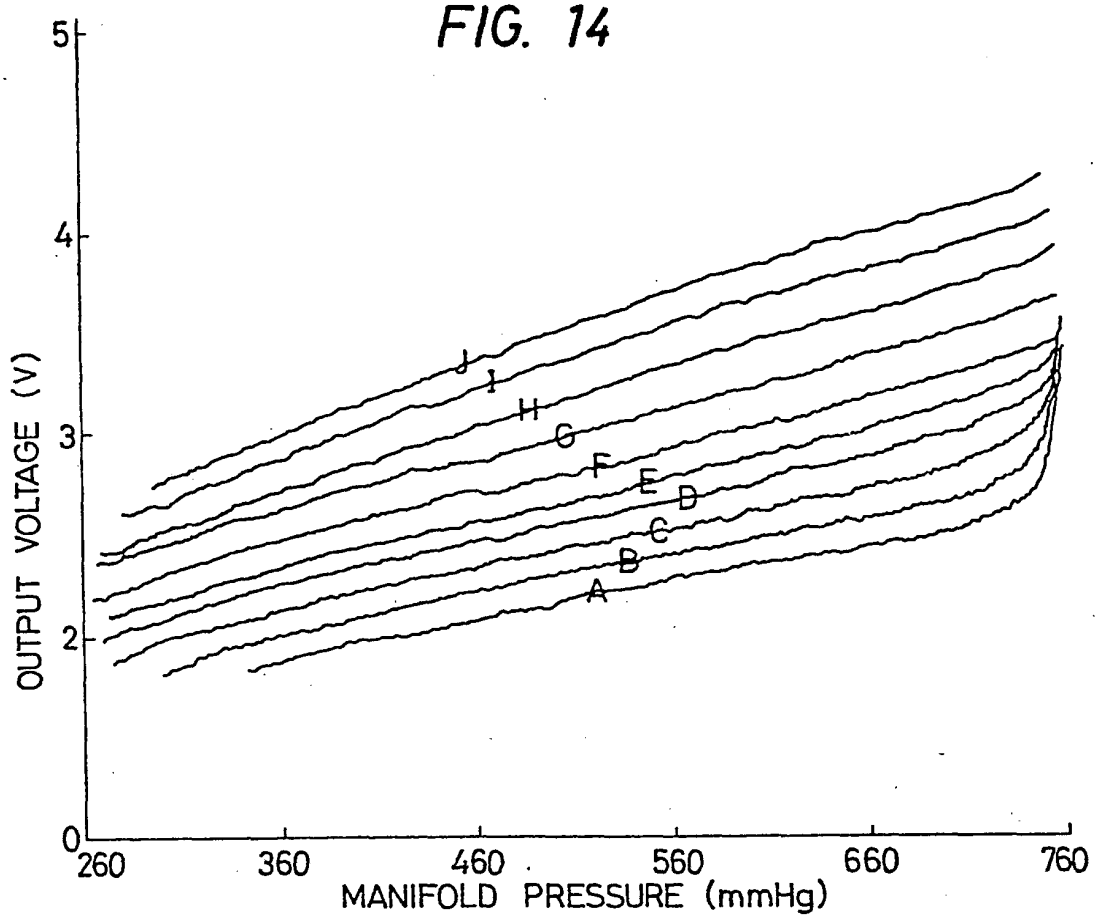



FIG. 15

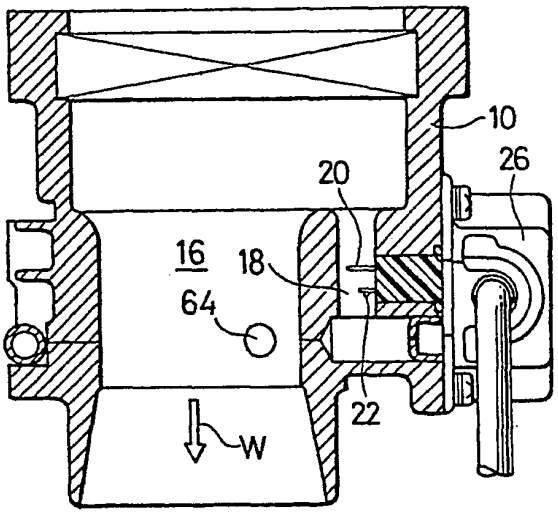



FIG. 16

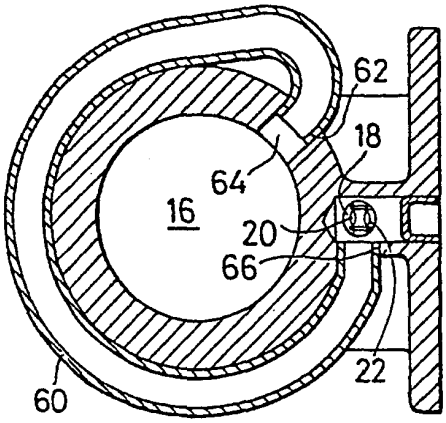


FIG. 17

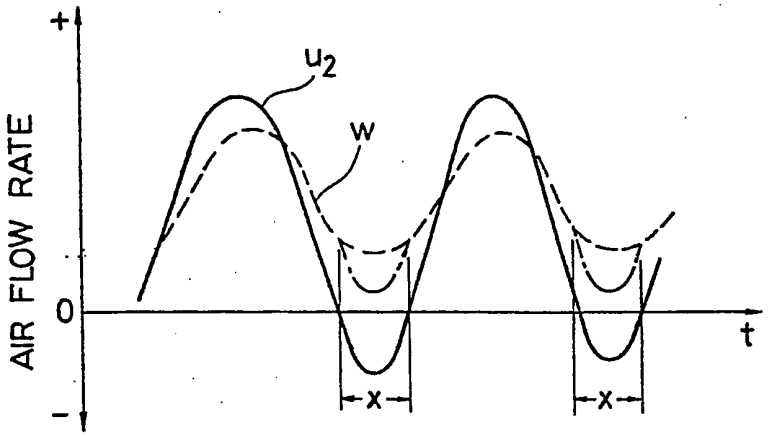



FIG. 18

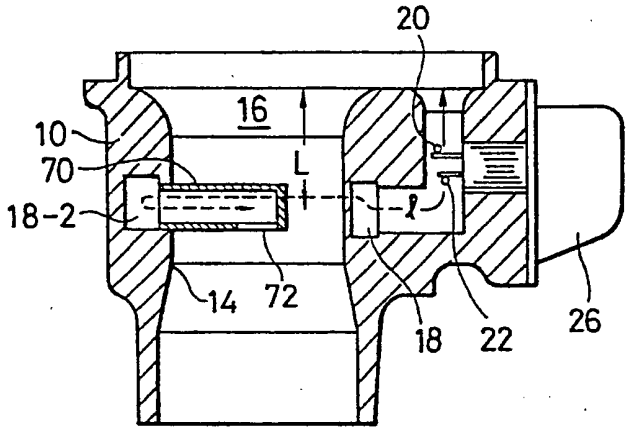



FIG. 19

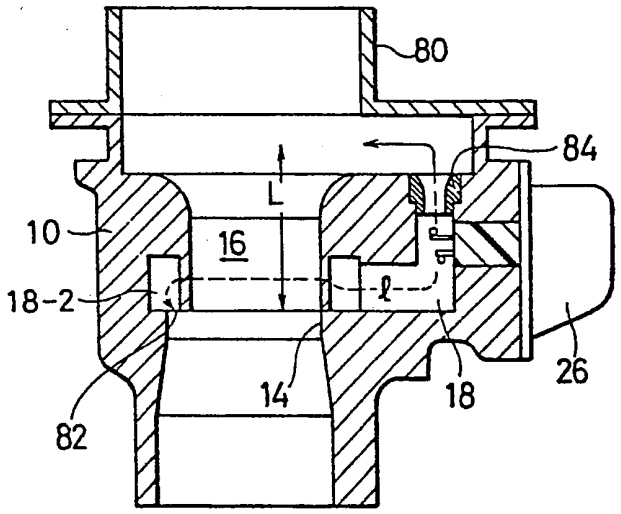


FIG. 20

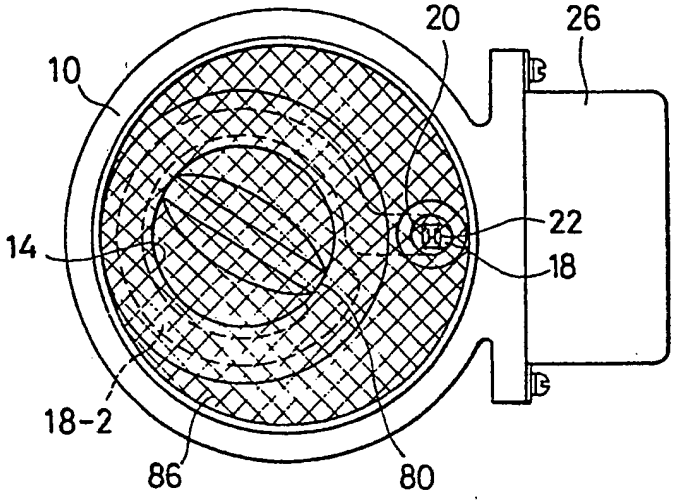



FIG. 21